MEASUREMENT/TECHNICAL REPORT

COMPANY NAME: **Radio Systems Corporation**

MODEL: **RF1002**

FCC ID: **KE3TXRF1002**

DATE: **July 27, 1998**

This report concerns (check one): Original grant_X_

Class II change_____

Equipment type: **Low Power Transmitter**

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes_____ No_X_

If yes, defer until:_____
date

__N.A.__ agrees to notify the Commission by__N.A.____
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Report prepared by:

United States Technologies, Inc.
3505 Francis Circle
Alpharetta, GA 30004

Phone Number: (770) 740-0717
Fax Number: (770) 740-1508

SECTION 2

TESTS AND MEASUREMENTS

TESTS AND MEASUREMENTS

Configuration of Tested System

The sample was tested per ANSI C63.4, Methods of Measurement from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (1992). Conducted and radiated emissions data were taken with the test receiver or spectrum analyzer's resolution bandwidth adjusted to 9 kHz and 120 kHz, respectively. All measurements are peak unless stated otherwise. The video filter associated with the spectrum analyzer was off throughout the evaluation process. Interconnecting cables were manipulated as necessary to maximize emissions. A block diagram of the tested system is shown in Figure 1. Test configuration photographs for spurious and fundamental emissions are shown in Figure 2.

The EUT was set up with a 250' length of wire connected to it, to simulate a typical installation. The wire was not buried, as it would be in a typical installation (approximately 2 -3 inches). Measurements were taken at all three antenna polarities on each side of the square and intervals in between, at a distance of 3 meters. The side with the worst case results was re-measured at a distance of 10 meters. Those results were corrected to 300 meters by the following 40 log (300/10) = 59.1 dB

Test Facility

Conducted testing was performed at US Tech's measurement facility as described to the FCC and acknowledged in their letter marked 31040/SIT/USTECH.

Additional radiated testing was performed at a vacant area that would allow measurements to be made 10 meters away from the EUT with the 250' length of wire connected to it.

Test Equipment

Table 2 describes test equipment used to evaluate this product.

Modifications

No modifications were made to bring the EUT into compliance with FCC Part 15, Class B Requirements:

FIGURE 1

TEST CONFIGURATION

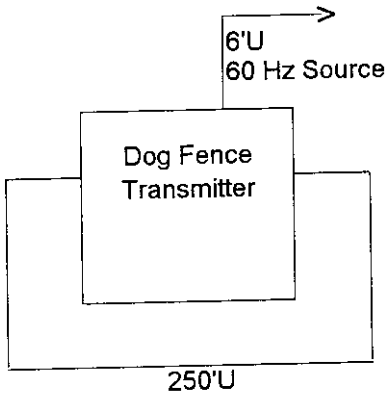

TABLE 1

EUT and Peripherals

PERIPHERAL MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID:	CABLES P/D
Dog Fence Transmitter Radio Systems Corporation (EUT)	RF1002	None	KE3TXRF1002 (Pending)	250' U

TABLE 2

TEST INSTRUMENTS

TYPE	MANUFACTURER	MODEL	SN.
SPECTRUM ANALYZER	HEWLETT-PACKARD	8593E	3205A00124
SPECTRUM ANALYZER	HEWLETT-PACKARD	8558B	2332A09900
S A DISPLAY	HEWLETT-PACKARD	853A	2404A02387
COMB GENERATOR	HEWLETT-PACKARD	8406A	1632A01519
RF PREAMP	HEWLETT-PACKARD	8447D	1937A03355
RF PREAMP	HEWLETT-PACKARD	8449B	3008A00480
HORN ANTENNA	EMCO	3115	3723
ROBERTS ANTENNAS	COMPLIANCE DESIGN	A100	167
BICONICAL ANTENNA	EMCO	3110	9307-1431
LOOP ANTENNA	AH SYSTEMS	SAS200/562B	217
LOG PERIODIC ANTENNA	EMCO	3146	9110-3600
LISN	SOLAR ELE.	8012-50	N/A
THERMOMETER	FLUKE	52	5215250
MULTIMETER	FLUKE	85	53710469
FUNCTION GENERATOR	TEKTRONIX	CFG250	CFG250TW15059
PLOTTER	HEWLETT-PACKARD	7475A	2325A65394
BILOG	CHASE	CBL6112A	2238

Field Strength of Fundamental Emission (47 CFR 15.209)

Measurements were made using a peak detector. Field strength of the peak fundamental emission is shown in Tables 3 and 4.

TABLE 3

FIELD STRENGTH OF FUNDAMENTAL EMISSION

Test Date: May 21, 1998
UST Project: 98-021
Customer: Radio Systems Corporation
Model: RF1002

FREQ. (KHz)	TEST DATA (dBm) @ 10m	ANTENNA FACTOR + CABLE ATTENUATION	RESULTS (uV/m) @ 300m	PEAK FCC LIMITS (uV/m) @ 300m
10.8	-84.8	79.2	130.3	222.2 ✓

42.3 46.9 dBuV/m @ 300

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-84.8 + 79.2 + 107 - 59.1)/20) = 130.3
CONVERSION FROM dBm TO dBuV = 107 dB
CORRECTION FROM 10m TO 300m = -59.1 dB

Tested By: _____ Name: Erik Collins

Field Strength Of Spurious Emissions (47 CFR 15.209)

Measurements were made using a peak detector. Field strength of Spurious Emissions are shown in Table 4. For all emission measurements made the limits given in 15.209 were applied.

TABLE 4

FIELD STRENGTH OF SPURIOUS EMISSIONS

Test Date: May 21, 1998
UST Project: 98-021
Customer: Radio Systems Corporation
Model: RF1002

FREQ. (KHz.)	TEST DATA (dBm) @ 10m	ANTENNA FACTOR + CABLE ATTENUATION	RESULTS (uV/m) @ 300m	PEAK FCC LIMITS (uV/m) @ 300m
21.8	-98.3	73.5	14.3	110.1
22.6	-97.3	73.3	15.7	106.2
25.4	-96.8	72.7	15.5	94.5
25.6	-96.2	72.7	16.6	93.8
26.1	-96.7	72.6	15.5	92.0
26.2	-99.1	72.6	11.7	91.6
27.1	-98.2	72.4	12.7	88.6

41.5

SAMPLE CALCULATIONS:

RESULTS uV/m @ 3m = Antilog ((-98.3 + 73.5 + 107 - 59.1)/20) = 14.3
CONVERSION FROM dBm TO dBuV = 107 dB
CORRECTION FROM 10m TO 300m = -59.1 dB

Tested By: _____ **Name:** Erik Collins

Radiated Emissions (47 CFR 15.109a)

Since the highest frequency generated or used was less than 1.705 MHz, radiated measurements above 30 MHz were not performed.

Power Line Conducted Emissions (47 CFR 15.107a)

Conducted Emissions were evaluated from 450 KHz to 30 MHz. Measurements were made with the analyzer's bandwidth set to 9 KHz, emissions are shown in Table 5. Since the EUT may operate with various fence lengths, and as little as 10', the EUT was checked with 250' and 10' fence lengths. All readings given are for worse case with a 10' fence length.

TABLE 5 CONDUCTED EMISSIONS DATA

CLASS B

Test Date: April 21, 1998
UST Project: 98-021
Customer: Radio Systems Corporation
Model: RF1002

FREQUENCY (MHz)	TEST DATA (dBm)		RESULTS (uV)		FCC LIMITS (uV)
	PHASE	NEUTRAL	PHASE	NEUTRAL	
0.45	-66.0	-63.0	112.2	158.5	250
0.52	-73.0	-67.0	50.1	100.0	250
1.5	-78.0	-87.0	28.2	10.0	250
3.6	-86.0	-91.0	11.2	6.3	250
13.2	-89.0	-91.0	7.9	6.3	250
20.0	-91.0	-92.0	6.3	5.6	250

SAMPLE CALCULATIONS:

RESULTS uV = Antilog ((-66.0 + 107)/20) = 112.2
CONVERSION FROM dBm TO dBuV = 107 dB

Tested By: _____ **Name:** Brian T. Parks